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The Marine Corps, through a Navy system, has been tracking aviator training production and throughput since 1998 in order to ensure that operational needs are met on an annual basis for aircrew. The Naval Aviator Production Process has matured to a point where there is monthly communication between the Navy and Marine Corps on aviator production issues and quarterly there are briefings to the Chief of Naval Air Training on production. The visibility and communication that this process has created provides benefit to the Navy and Marine Corps. Now is the time for an enlisted aviation production process to be established that can exploit the success that the Naval Aviation Production Process has had. Creating this process and bringing all the involved organizations together with one common goal will allow for enlisted aviation personnel to meet operational force needs in an efficient manner. The gained efficiency will allow for manpower savings and eventually cost reduction in a time of fiscal and manpower constraint.

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Marine Corps Combat Development Command
Quantico, Virginia 22134-5068

MASTER OF MILITARY STUDIES

DOES THE MARINE CORPS NEED AN ENLISTED AVIATION PRODUCTION PROCESS?

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

MAJOR JEREMY D BROCKMEIER

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Mentor and Oral Defense Committee Member: _Dr. Otis_____
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Executive Summary

Title: Does the Marine Corps Need an Enlisted Aviation Production Process?

Author: Major Jeremy Brockmeier, United States Marine Corps

Thesis: The Navy has made a concerted effort to track the production for Naval Aviators through the Naval Aviator Production Process. Although the Marine Corps is not responsible for the training of enlisted aviation personnel, they need a production process to ensure the proper management and production of these Marines.

Discussion: The Marine Corps, through a Navy system, has been tracking aviator training production and throughput since 1998 in order to ensure that operational needs are met on an annual basis for aircrew. The Naval Aviator Production Process has matured to a point where there is monthly communication between the Navy and Marine Corps on aviator production issues and quarterly there are briefings to the Chief of Naval Air Training on production. The visibility and communication that this process has created provides benefit to the Navy and Marine Corps.

Now is the time for an enlisted aviation production process to be established that can exploit the success that the Naval Aviation Production Process has had. Creating this process and bringing all the involved organizations together with one common goal will allow for enlisted aviation personnel to meet operational force needs in an efficient manner. The gained efficiency will allow for manpower savings and eventually cost reduction in a time of fiscal and manpower constraint.

Conclusion: Enlisted aviation training production management will ensure that the needs of the operational forces are met, leadership is informed and all organizations involved in the process share the same goal.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

Preface

I was tasked with creating and monitoring the enlisted aviation production process in 2008 as a member of the Aviation Production Management section in the Aviation Training Branch of Training and Education Command. During my year at Training and Education Command I was able to make some progress in establishing the process, and bringing awareness to leadership, that the management of these enlisted aviation Marines was important. In 2009, my office was moved to the G-3 of Training Command with the same mission of monitoring enlisted aviation production. During that year, we were able to bring some of the issues involved in the process and the importance of the process to leadership at Training Command, Training and Education Command, Assistant Deputy Commandant for Marine Corps Aviation and the Center for Naval Aviation Technical Training. Although this effort was acknowledged as important it still has not gained the traction that I believe it needs to make a significant change in the way the Marine Corps produces and monitors enlisted aviation personnel. My hope is that this paper will be a catalyst for change and someone will take the next step with this process.

I would like to thank my wife, Karen, for her editing and patience with me in writing this paper. I would like to thank Dr. Pauletta Otis for her guidance, mentorship, and rudder guidance during this process. Lastly, I would like to thank all those that assisted in developing this process over the past three years from Manpower and Reserve Affairs, Training and Education Command, Training Command, Department of Aviation, and Marine Aviation Training Support Group 21. Specifically, Major Bob Boyero and Major Pete Tavares (Ret) from the Enlisted Aviation Training Management Unit.

Acronyms

AMS	Aviation Maintenance Squadron
APM	Aviation Production Management
AR	Active Reserve
ASL	Aviation Logistics
ASM	Aviation Manpower Support
ATD	Aviation Training Division
AWAT	Awaiting Training
CETARS	Corporate Enterprise Training Activity System
CG	Commanding General
CMC	Commandant of the Marine Corps
CNATT	Center for Naval Aviation Technical Training
CNATTMARU	Center for Naval Aviation Technical Training Marine Unit
CNATTU	Center for Naval Aviation Technical Training Unit
CNET	Chief of Naval Education and Training
DC/A	Deputy Commandant for Aviation
DC/M&RA	Deputy Commandant for Manpower and Reserve Affairs
EAC&M	Enlisted Aircrew and Maintenance Production
EAMTMU	Enlisted Aviation Training Management Unit
EMC	Enlisted Marine Control
FASO	Fleet Aviation Specialized Operational training
FRS	Fleet Replacement Squadron
FSRG	Force Structure Review Group
FSTD	Formal Schools Training Division
FTAP	First Term Alignment Plan
FY	Fiscal Year
ITS	Individual Training Standards
ITSS	Individual Training Standards System
MATMEP	Maintenance Training and Evaluation Program
MATSG	Marine Aviation Training Support Group
MCCDC	Marine Corps Combat Development Command
MCTIMS	Marine Corps Training Information Management System
MM	Manpower Management
MMEA	Manpower Enlisted Assignments
MMEA-11	Manpower Recruit Distribution
MOS	Marine Occupational Specialty
MP	Manpower Plans and Policy
MPP-20	Manpower Enlisted Plans
NAPP	Naval Aviation Production Process
NATTC	Naval Aviation Technical Training Center
PEF	Program Enlisted For
RA	Reserve Affairs

RAM	Reserve Affairs Manpower
RAP	Reserve Affairs Policy
RDM	Recruit Distribution Model
STAP	Subject Term Alignment Plan
TECOM	Training and Education Command
TIP	Training Input Plan
TMS	Type Model Series
TOC	Theory of Constraints
TRNGCMD	Training Command
T&R	Training and Readiness
TTT	Time To Train
T2P2	Transients, Training, Prisoners, Patients

Introduction

The Marine Corps needs an enlisted aviation production process. With a shrinking defense budget there is an increasing need for fiscal responsibility and process efficiency can provide budget savings. By maximizing efficiency in the aviation production process the Marine Corps will benefit by getting students through training more efficiently, eliminate unnecessary manpower redundancy, and ensure the Marine Corps is producing the occupational specialties that are needed. In 1998, the Naval Aviator Production Process Improvement (NAPPI) program was started under the direction of OPNAV N88 to improve Fleet Replacement Squadron (FRS) output of first tour aviators (pilots and naval flight officers) in the Navy and Marine Corps.[1] N88 was guided by two points: 1) Reduce Aviator Time-To-Train (TTT), and 2) Annual Naval Aviator output must meet fleet requirements in sufficient numbers to ensure a three year first tour.[2] This resulted in the training of approximately one third of first-tour fleet aviators annually.[3] The process has matured to the point that it has expanded to include Naval/Marine Corps Enlisted Aircrew,[4] but has not incorporated enlisted aircraft maintainers and support personnel. Enlisted aviation produces approximately 5,000 personnel across eighty Marine Occupational Specialties (MOS) annually.[5] The Marine Corps has not felt the need to manage these Marines by TTT and ensure annually that output is meeting fleet requirements?

There are many organizations responsible for the oversight of Marines being accessed and trained at the recruit depots and schools of infantry, but there is little understanding or research about what happens to them or who is responsible for them heading to and through their initial MOS training. The goal of this paper is to clearly identify these organizations, the gaps in the process, establish responsibility, and propose a production system that would generate the right number of Marines, with the right training, at the right time to the operational forces.

To fully explain the complexity of the problem, the process is broken down by major command and significant subordinate commands that have a share in the process. Each command is presented in detail with their mission statements and importance to the enlisted aviation production process. The process of training an enlisted aviation Marine is broken down and shortfalls of the current process will be identified. Detailed information on the current process and the organizations involved comes from first hand knowledge in creating the process and working on a daily basis with them. Lastly, a proposed solution is identified based upon a combination of management tools that lay the groundwork with the theory of constraints, reduces waste with Lean initiatives, and corrects defects through Six Sigma analysis. The premise is that all organizations involved must share in the same goal when it concerns enlisted aviation production.

Background

The current enlisted aviation production process is loosely defined and does not account for the multiple organizational handoffs that are required for the process to work properly. This is due to lack of understanding of each commands responsibility, limited senior officer involvement, and poor measurements of success. There are seven stakeholders responsible for ensuring that the Marine Corps is sufficiently equipped with enlisted aviation personnel. The stakeholders and their significant subordinate units are: the Center for Naval Aviation Technical Training (CNATT), Marine Corps Combat Development Command (MCCDC); Training and Education Command (TECOM), Training Command (TRNGCMD), Marine Aviation Training Support Group-21 (MATSG-21), Deputy Commandant for Manpower and Reserve Affairs (DC/M&RA), and the Deputy Commandant for Aviation (DC/A). Each one of these commands, or their subordinate unit, has a critical role in the enlisted aviation production process and the

flow of students through this process. To ensure a true understanding of the environment, each unit's responsibility is discussed in detail.

Center for Naval Aviation Technical Training

"Under Title 10 U.S. Code, the Navy, within the Department of the Navy states that "all naval aviation shall be integrated with the naval service " and encompasses "all service training forces, and land based naval aviation, air transport essential for naval operations, all air weapons and air techniques involved in the operation and activities of the Navy."[6] CNATT was established in early February of 2003.[7] CNATT is one of 14 "Learning Centers" under the Naval Personnel Development Command, Norfolk, Virginia, tasked with developing and maintaining the Sailor/Marine Training Continuum.[8] CNATT, a shore activity of Chief of Naval Education and Training (CNET),[9] now provides single site management for Navy and Marine Corps Aviation Technical Training.[10] The Pensacola based headquarters is responsible for 20 sites located throughout the continental United States and Japan.[11] CNATT, with a staff of over 3,000, trains more than 130,000 students annually in the U.S. and abroad.[12] The center is responsible for curriculum and educational tools, as well as developing training solutions and professional development for all Navy aviation ratings, Airman, related Aviation Maintenance Officer training and training for Marine Corps Aviation MOS requirements.[13]

The Center for Naval Aviation Technical Training's mission is to develop, deliver, and support aviation technical training necessary to meet validated fleet requirements through a continuum of professional and personal growth for Sailors and Marines.[14] A subordinate command of CNATT is Naval Air Technical Training Center (NATTC). They are responsible for training the initial technical phases or "A" schools, for enlisted aviation students. Organizational subunits of CNATT, or "C" schools, are CNATT Units (CNATTU, which is a

Navy led organization and is a shared Type Model Series (TMS) aircraft between the Marine Corps and Navy i.e. F/A-18) and CNATT Marine Units (CNATTMARU, which is a Marine led organization and is TMS specific to the Marine Corps i.e. AH/UH-1). CNATTU/CNATTMARU are composed of an officer in charge or a chief petty officer in charge and experienced Navy and/or Marine Corps aircraft maintenance instructors.[15] CNATT Headquarters provides command policy, guidance, and direction for all curriculum and instructional support, technical coordination to resolve problems and maintain course standardization between locations.[16] Course Curriculum Model Managers (CCMM) are those individuals assigned responsibility by the CNATT Headquarters for curriculum development, implementation, and upkeep of a specific course and are located at the CNATTU/CNATTMARU.[17] In conclusion, CNATT is the organization responsible for technical training, education, trainers, and course curriculum management.

Marine Corps Combat Development Command

Marine Corps Combat Development Command (MCCDC) is responsible for developing fully integrated Marine Corps warfighting capabilities, including: doctrine, organization, training and education, material, leadership, personnel, and facilities, to enable the Marine Corps to field combat-ready forces.[18] As previously discussed, the Navy, particularly CNATT, is responsible for all aviation technical MOS training and education and are loosely aligned to subordinate units of MCCDC, TECOM and TRNGCMD.

Training and Education Command

TECOM is responsible for developing, coordinating, resourcing, executing, and evaluating training and education concepts, policies, plans, and programs to ensure Marines are prepared to meet the challenges of present and future operational environments.[19] There are two

divisions that play a significant role in the training and education of enlisted aviation personnel within TECOM. They are Aviation Training Division (ATD) and Formal Schools Training Division (FSTD). ATD's mission is to advise and represent the Commanding General, TECOM, as the authoritative source for aviation training and readiness for Marine aviation in support of the warfighter.[20] Within the Naval Aviation Enterprise and in cooperation with joint services, ATD aligns aviation training efforts, provides unified Service requirements for all aviation training matters, and establishes and ensures compliance with aviation training policies throughout the training continuum in order to develop and sustain a fully integrated aviation training system capable of preparing and evaluating Marine forces in the execution of the six functions of Marine Aviation.[21]

Aviation Training Division is primarily responsible for Training and Readiness (T&R) manuals policy revision for aviators and development for aviation maintenance, logistics, and command and control. ATD is the aviation training requirements advocate for the Marine Corps, responsible for the individual training standards system (ITSS) and the maintenance training management and evaluation program (MATMEP).[22] MATMEP is a standardized, documentable, level progression, technical skills training management and evaluation program for technical maintenance training MOS. This is a Marine Corps requirement developed to satisfy all requirements for the development for individual training standards (ITS), as set forth by the Commandant of the Marine Corps (CMC) and will conform with aviation maintenance training guidelines established by the Navy.[23] Seat allocation and course sponsorship are additional responsibilities split between ATB and the Enlisted Aircrew and Maintenance Production section of the G-3 at TRNGCMD. Specifically, seat allocations are done for the

Fleet Aviation Specialized Operational (FASO) training courses by CNATT, who own and operate them and provide post MOS awarded Marines and Sailors follow on specialized training.

Formal Schools Training Division's mission is to coordinate planning, scheduling, execution, tracking and reporting of training requirements across the entire Marine Corps formal training continuum in order to provide combat-capable Marines to the operating forces, sustain combat readiness, and facilitate continuing education of the force.[24] FSTD annually conducts a Training Input Plan (TIP) conference that develops a realistic and credible training input plan document in order to identify valid training requirements across the formal training continuum. This conference finalizes the next fiscal year requirements and confirms requirement projections for the next four years. Additionally, the TIP conference begins to look at prioritization of courses based on funding and capacity. Course sponsors provide input to the TIP. For enlisted Marine school seats they are: aviation logistics occupational field sponsors from the Department of Aviation for aviation transition and operational force needs, Manpower Plans and Policy-20/25 for initial accession and ground transition, Reserve Affairs Policy and Reserve Affairs Manpower for reservists, and Aviation Training Division for operational force needs and follow on training.

Training Command

Training Command is the Marine Corps' proponent for MOS individual-skill training, analysis, design, develops, resources, implements, and evaluates standards-based individual training in order to provide combat capable Marines and Sailors to the operating forces.[25] TRNGCMD is responsible for over 50 schools, representatives, and detachments that have over 9,000 permanent personnel and train in excess of 65,000 students per year (See Appendix B). TRNGCMD was established in 2000, and in 2002, the TRNGCMD staff was combined with

TECOM. In January 2009, with help from the 202,000 end-strength increase for the Marine Corps, TRNGCMD was finally able to breakout its staff and form its own separate headquarters.[26]

One of the original tasks required of TRNGCMD was to manage student flow from the recruit depots and Officer Candidates School in order to minimize impact on transients, training, prisoners, and patients (T2P2). This task was already being handled for aviation students by the Aviation Production Management (APM) section of ATD and eventually required the office to be moved under the G-3 of TRNGCMD. The premise being that under the TRNGCMD G-3, all MOS student production would be managed for aviation and ground MOS at this location and the ground schools would be able to create their process from what was established on the aviation side.

Aviation Production Management's core function is to consolidate and submit requirements, coordinate resources and provide production oversight to ensure timely delivery of the appropriate quantity and quality of aviation Marines to the operating forces. The process of aviation production management has matured since 1998 for aviators and enlisted aircrew through NAPP, but is in its infancy for aviation maintenance and support personnel. Created in 2008 to provide oversight and management for enlisted aircrew, maintenance and aviation support personnel, the enlisted aircrew and maintenance production (EAC&M) section of APM was formed. EAC&M is responsible for monitoring the enlisted aviation production process and build relationships necessary to review, validate and forecast emergent and dynamic training requirements capable of meeting the needs of the operating forces. EAC&M oversees the entire process for aircrew, maintainers, and support personnel and coordinates with CNATT on production issues for Marines attending Navy schools. Most importantly, EAC&M acts as a

support section for the enlisted aviation maintenance training management unit that belongs to MATSG-21.

There are five MATSGs in the Marine Corps (See Appendix C) that provide primarily administrative support, discipline, Marine particular training, and student throughput monitoring, for students and instructors assigned to Navy aviation commands. They are: MATSG-21 Pensacola, Florida, MATSG-22 Corpus Christi, Texas, MATSG-23 Lemoore, California, MATSG-33 Oceana, Virginia, and MATSG-53 Whidbey Island, Washington. All the MATSGs, except MATSG-22, deal with enlisted students training at a co-located CNATTU that provides the student's aircraft TMS technical training. Nearly all of these students receive their "A" school initial aviation technical training at NATTC prior to their follow on "C" school at the CNATTU/CNATTMARU. The support of the students' initial training at NATTC is the responsibility of MATSG-21.

Marine Aviation Training Support Group 21

MATSG-21 Pensacola, Florida, provides administrative support to assigned personnel in addition to other tasks as directed by the CMC.[27] This support is directed primarily towards personnel in the Naval Air Training Command and The Naval Aviation Technical Training Center with support to ten ancillary activities. The command is principally manned by approximately 21% permanent personnel and 79% aviation students; both enlisted and officers.[28] While the MATSG mission is administrative in nature, the command monitors the flow of students through the schoolhouses, provides Marine Corps discipline and Marine Corps particular training.[29] On the table of organization (T/O), in addition to the permanently assigned staff headquarters of approximately 110 personnel, are all the instructor personnel for Training Wings 1/5/6 that perform student naval aviator instruction and also the approximately 325

personnel assigned to NATTC as instructors and support personnel. These instructors assigned to NATTC and the training wings provide the Marine Corps' "fair share" of instructors to support Marine Corps throughput in Navy aviation schools annually.

Students are received weekly by the enlisted marine control (EMC) office of MATSG-21, EMC is responsible for screening and assigning the students to the appropriate aviation maintenance squadron (AMS) to begin their training. MATSG-21 has two AMS, AMS-1 and AMS-2 that provide quality support, Marine Corps specific training, and leadership to the Marine aviation enlisted students.[30] AMS-1 is responsible for the aircrew, power plants, airframes and hydraulics, life support, support equipment, ordnance, expeditionary airfield, and mechanical students. AMS-2 is responsible for all aviation electrician, organizational and intermediate level avionics technicians, air traffic control navigational aid, radar, and communication technicians, and air traffic control students. These students are monitored administratively and as part of the production process, but the overall production process output to the CNATTU/CNATTMARU is the responsibility of EAMTMU and is a separate MATSG-21 headquarters office under the Operations Department.

Enlisted Aviation Maintenance Training Management Unit "provides planning, scheduling, assignment, and individual monitoring of the technical aviation training "C" school of Marines to meet the needs of the Marine Corps' operating forces."[31] EAMTMU is tasked with "formulating plans to implement aviation technical training requirements established by the Commandant of the Marine Corps."[32] "Schedule formal technical training to meet developed training plans,"[33] "assign initial entry Marines to MOS capable training to meet the MOS requirements established by the Commandant of the Marine Corps,"[34] and "assign quotas to Marine Aviation units as requested to satisfy special and career training requirements and

monitor the technical training of Marine Aviation requirements."[35] EAMTMU has an aviation liaison assigned to the School of Infantry (SOI) East and West to screen all aviation students prior to them arriving to Pensacola. There is also a liaison attached to Navy Personnel Command in Millington, Tennessee, that is responsible for Marine Corps quota management for all of the Navy courses that enlisted aviation students attend. To conduct their mission, EAMTMU has staff non commissioned officers (SNCO) assigned as monitors that cover ordnance, intermediate level avionics, organizational level avionics, aviation mechanics, aircrew, airframes, power-plants and support equipment.[36] Students arrive to EAMTMU with their program enlisted for code (PEF), which will dictate the basic field into which they will go. Near the end of their initial training EAMTMU, as a classification authority, designates the last two digits of the students MOS based upon a variety of inputs and assign them orders to their "C" school.

Deputy Commandant for Manpower and Reserve Affairs

The "Deputy Commandant for Manpower and Reserve Affairs assists the Commandant by planning, directing, coordinating, and supervising both active and reserve forces."[37] DC/M&RA has six divisions, three of which are involved in the enlisted aviation production process; Manpower Plans and Policy (MP) Division, Reserve Affairs (RA) Division, and Manpower Management (MM) Division. MP Division is responsible for formulating Marine Corps force manpower and mobilization plans.[38] MP Division determines the total manpower needs and prepares plans, policies, programs, and instructions on manpower matters to implement the CMC's policies and decisions.[39] MP Division in the enlisted aviation production process determines the allocation and distribution of enlisted aviation trainees and develops the manpower plans and programs for accession, classification, promotion and retention for active

component personnel.[40] The enlisted plans section (MPP-20) is responsible for enlisted end strength, career force, enlisted inventory, first term inventory and promotions.[41] MPP-20 also does missioning for both first term alignment plan (FTAP), which is focused on Marines in their first enlistment, and the subject term alignment plan (STAP), which is focused on career Marines.[42] The determining of the allocation and distribution of manpower combined with accession and classification that will be based upon STAP and FTAP numbers are significant contributors annually in the production of enlisted aviation personnel.[43]

Reserve Affairs Division "assists the Commandant of the Marine Corps with the achievement of a ready and relevant Reserve Component appropriately integrated into the Total Force Marine Corps."[44] RA Division directs and coordinates reserve manning, personnel assignments and career development. They also establish plans and policies to meet operational requirements of the Marine Forces Reserve.[45] RA Division's two key branches that are involved in the enlisted aviation production process are Reserve Affairs Personnel Management (RAM) and Reserve Affairs Policy (RAP). RAM coordinates personnel assignments and career development for Reserve Component Marines.[46] RAM is primarily focused on active reserve (AR) Marines that fill a variety of MOS and ensure staffing of these Marines requirements are filled and established by CMC manning precedence. RAP is responsible for the formulation of manpower plans, personnel policies and procedures for the Marine Corps Reserve and divided into the Personnel Policy Section and the Personnel Plans Section.[47] The policy section is involved in issues related to reserve force management policy and legislation, while the plans section is involved in issues related to prior and non-prior service recruiting manpower plans and entry level training programs.

Manpower Management Division is responsible for the administration, retention, distribution, appointment, evaluation, awarding, promotion, retirement, discharge, separation, and service records of commissioned officers, warrant officers and enlisted personnel in the Marine Corps.[48] Enlisted Assignments Branch (MMEA) classifies, distributes, assigns, and retains active component enlisted Marines in order to fill the manpower requirements of the Marine Corps.[49] Recruit distribution (MMEA-11) is responsible for classification according to the initial classification plan via the recruit distribution model (RDM), which is evaluated and run on a regular basis.[50]

Deputy Commandant for Aviation

The Deputy Commandant for Aviation is responsible for assisting and advising the Commandant of the Marine Corps on all matters relating to aviation.[51] Two of their branches play a significant role in the enlisted aviation production process; they are Aviation Manpower and Support (ASM) and Aviation Logistics (ASL). ASM provides staff support to DC/A on aviation manpower support matters and aviation support coordination matters.[52] ASL develops and coordinates doctrine, policy, practices, procedures, management, training, personnel and procurement for all aviation logistics and support MOS. In addition, they provide occupational field sponsors (Occ-Field Sponsor) for all 6XXX, 73XX, 70XX MOS.[53] This requires the sponsor to monitor the assignment and overall health of their MOS and ensures that the personnel are assigned in a manner that best supports Marine Corps aviation success.

Part 2

Current Process

The current process begins with the TIP and requires valid training requirement information that will be turned into actual school seats by FSTD. The sponsors (RAM, RAP,

MPP-20/25, ASL, ATD) generate the school seat requirements for the TIP. The school seat data that is inputted into the Navy database is validated by the Marine Corps liaison in the Navy Quality Management Office in Millington, Tennessee and coordinated with EAMTMU. APM acts as an intermediary with the Navy and EAMTMU to facilitate additional seats as needed and to ensure adjustments are correctly made in the system interface. MMEA-11 runs and publishes the RDM output, which gives the Marines their initial classification (first two digits of their MOS). APM will monitor the run data with MPP to ensure accuracy according to operational force needs. Orders are then generated at SOI East and West and the aviation students are sent to Pensacola. The students are screened again by EAMTMU and are then sent through EMC, which coordinates start date for students' "A" school. While they are in "A" school the students fall under their appropriate AMS for administrative purposes. Just prior to completion of "A" school the students are classified again by EAMTMU (last two digits of their MOS) and orders are coordinated with MMEA to send the student to their follow on "C" school. CNATTU/CNATTMARU will train the students in their particular TMS specialty and will coordinate orders to the students' operational unit (See Appendix D). The process described is for the average student as they flow through the process. There are many different obstacles a student may come across as they progress, like being recycled for academics or dropping on request from a specific program, but this is the basic flow.

Part 3

Process Shortfalls

There are three areas in the process that need to be addressed: 1) there is no universal measurement that identifies success or failure, 2) the process is not aligned through all of the

organizations that play a role in production, and 3) Service database interface problems create additional work and an unreliable system.

1) Each organization has its own measurement or goal that the organization is focused on to determine success. CNATT HQ has a heavy focus on how quickly students pass through "A" school on to "C" school. CNATT has significant influence and focus to reduce awaiting training time (AWAT) for all students Navy or Marine. MPP measures success by how well each year group (cohort) does in meeting the fiscal year classification plan while FSTD determines success by accuracy of TIP requirements annually. EAMTMU executes the classification plan and monitors the production efforts for each MOS that they have classification for, but they do not have a venue to report annual success or failure. Operational forces have no means to communicate student deficiencies back to the schoolhouses. The CNATTU/CNATTMARU build their schedules off TIP numbers for students that are supposed to be trained and they train what arrives at their doorstep.

2) The organizations involved in the process that are responsible for meeting operating force requirements are not aligned under a single chain of command. Title 10 responsibilities to train the Marine Corps aviation technicians falls on the Navy, but the Navy is not concerned with the Marine Corps operational needs. So all CNATTU/CNATTMARU report directly back to CNATTU CO and have no formal relationship with the Marine Corps or TECOM.

3) The Marine Corps' system for training is Marine Corps training information management system (MCTIMS), the Navy database is corporate enterprise training activity system (CETARS). These two systems have a one-way interface that requires data fields to match exactly in order to work properly. The result is an unreliable manpower intensive process that requires a great amount of monitoring of both systems by EAMTMU and FSTD to ensure

that school seats are not lost and the availability is there when needed. If these seats do not match in both systems, when MCTIMS feeds the RDM, the risk is run of students being inadvertently assigned to class convening dates that are not correct. TECOM is responsible for meeting the training needs of the operational forces, but is not aligned with DC/M&RA, who determines the number of Marines per MOS.

The resulting effects on the current process have proven to be unpredictable and unreliable in performance delivery, due to ever shifting constraints within the system that result in shuffling priorities and excess AWAT increasing cost. This is why the Marine Corps needs a solution to manage enlisted aviation personnel that will allow for improved efficiency and eventually lead to cost reduction.

Part 4

Solution

To create an effective process for enlisted aviation production, it is important that the whole process be viewed as a system made up of different organizations that are working in unison to achieve a common goal. This system for the enlisted aviation production process should be based on the tenants of the "theory of constraints" (TOC).

TOC is based on the theory of Dr. Eliyahu Goldratt, which builds on the principles of the quality management theory developed by Dr. Edward Deming, and the "just-in-time" (JIT) inventory control procedure developed by Taiichii Ohno.[54] TOC is primarily a process of continuing improvement based on rigorous cause-and-effect that focuses on the few constraints in the process that inevitably control the results for the entire system.[55] Since the system of enlisted production is inherently complex, TOC will allow focus to be placed on those areas that are constrained in the process and identify ways to increase production.

TOC identifies each system as having five basic similarities that predict success: 1) there should be a goal, 2) outcome or performance measurements, 3) a process, 4) process measurements, 5) rewards and incentives.[56] Each are discussed in the following paragraphs.

1) The goal for the enlisted aviation production process should be on meeting an annual requirement, driven by the operating forces, for each MOS that is in the process. This particular goal may not be the driving focus for each command, but must be the driver for all things pertaining to the production of enlisted aviation personnel. Now all decisions will be aligned with this single goal throughout the process and any variation throughout the process must be communicated to all shareholders. To achieve the mission annually, all necessary conditions must be met that are requirements to meeting the goal. Therefore, the finances to operate the trainers, instructors, school seats, and students required to meet throughput, must be in place to execute the mission (See Appendix E).

To maximize effectiveness in the enlisted aviation production process and align efforts properly, command re-alignment needs to take place. The current system places the responsibility of Marine Corps training on the CG, TRNGCMD, yet there is no formal relationship with the CNATTMARU. The establishment of a formal relationship with the CG, TRNGCMD and the CNATTMARU will provide better insight into enlisted aviation production and enable the CG, TRNGCMD to have the ability to render support as needed to these locations. Additionally, there are various aviation detachments that are isolated with little support. The solution would be to assign all these aviation-related detachments and CNATTMARU, to the regional MATSG connecting them to TRNGCMD and giving them the appropriate support and oversight they deserve. EAMTMU is currently working for the S-3 at MATSG-21, but there is no responsibility on the MATSG-21 CO for enlisted aviation production

or the execution of the MPP-20 derived annual classification plan. A better solution for EAMTMU might be to administratively attach them to MATSG-21 and have them be operationally responsible to MPP-20, DCA, or TRNGCMD G-3, who is responsible for enlisted production.

3) Outcome and performance measurements will have to be directly, or indirectly, tied to the goal. The only meaningful measure of the system will be how well it is performing to its goal; therefore, the measurements should be, somehow, reflective of the goal. Using proper measurements will guide behavior in how they approach all aspects and keeping everything relative to the goal. The overall goal in the enlisted aviation production process is the meeting of operational force needs on an annual basis for all MOS in the process. The measurements should focus on TIP, planned school seats, additional capacity, seats filled, graduates, students awaiting instruction, attrition, instructors on board, and performance relative to current and prior fiscal year (FY). It is important to track the FY cohort classification plan, enrollees and graduates for each MOS. Due to length of courses and other factors, it can take up to two full FY to complete one year of cohort. These particular measurements will show how progress is being made, relative to the goal and will identify problems in the system that need to be addressed to ensure that the goal is reached.

3) The current process identified various interdependent activities that make up the system. The next step is to increase the student flow and reduce the AWAT, which will increase consistent demand and make the system more successful in achieving the goal. There are three things that can significantly impact the flow of students: interdependencies, constraints, and variability. To efficiently produce a Marine, with the right training, and delivered at the right time, requires multiple organizations to be functioning as a single system. Currently, this

process is run in isolation on local efficiency and productivity. The identified reliance on interdependencies is critical and the understanding of the goal and the measures put in place to ensure attainment of the goal are essential. It then becomes important to reward behavior that is focused on the achievement of the goal by incentivizing and recognizing accomplishment. Once the entire system is aligned as a single organization the constraints will become readily identifiable. Once the constraints have been identified and managed, variability reduction can become the system focus. Variability in the system is inherent to the process and it must be managed, but it cannot be controlled. Due to myriad circumstances, student production flow will have variation in the process. Therefore, variation must be embraced and then reduced as much as possible to achieve a reliable process.

Theory of constraints uses the five focusing steps (See Appendix F) to create a process of on going improvement: "1) Identify the systems constraints. Constraints are categorized as either physical or policy constraints. 2) Decide how to exploit the systems constraints. The systems constraints should be fully exploited so that the maximum output is achieved from the system. 3) Subordinate everything else to the above decision. The decision of how to exploit the full potential of the constraint will place limits on all other decisions affecting the operation of the system. 4) Elevate the system's constraints. If we can elevate or reduce the impact of the constraints limiting effect, the systems performance can be improved. If the constraint can be sufficiently elevated eventually it can be broken. 5) If in the pervious steps the constraint has been broken, then it will no longer be the limiting factor and another constraint will have arisen in the system. Before the five focusing steps can be applied, there must be an understanding of the system, its goal, and the necessary conditions and interdependencies that exist."[57] In the enlisted aviation production process the system becomes constrained at the entry to "A" and "C"

schools because of class convene dates and class seat availability and is the area where the greatest benefit can be seen from maximizing performance. All other activities in the process should be subordinated and synchronized to this effort to gain the greatest efficiency in the process.

The next step is to determine how to exploit the constrained area, ensuring that the constraint is never starved and always has students available to start in a class. It is imperative that a school seat or class convening date not be missed, because it cannot be made up. Buffers (student pools) will be strategically placed in front of the constraint in the process to ensure that there is always someone available to start a class (See Appendix G). These student pools, if used correctly, can provide focus and an early warning system to protect throughput. There must be a link to release students into the system at a rate that the constrained areas can flow the students through. By identifying the system's constraint, exploiting the constraint, subordinating and synchronizing everything else to the constraint, ensuring that there are always students available to start classes, and gating the release of students from the RDM to the class convening dates, there will be substantial increases in student throughput and a decrease in idle student pools, therefore decreasing operating expenses.

If there is no available room for additional student throughput in the processes current state, the next step would be to elevate the systems constraint, or find a way to get more students through the courses. This typically comes with a dollar amount attached and would require additional school seats be available per class or additional class convening dates on top of what would already be scheduled. At a minimum, this would require an increase in instructors to make this effort viable. This is the fourth step and all efforts to get maximum capacity out of elevation should have been exhausted. Increasing the capacity of the schoolhouse by adding

additional school seats or more class convening dates can cause the constraint to shift elsewhere in the process. When the constraint shifts, start over with step one of the five focusing steps. It is critical in this aspect to "not allow inertia to become the systems constraint."[58] The five focusing steps enable the interdependent activities to break the core conflict of focusing on global performance or focus on local performance and align local and global performance to a single goal, resulting in a system that is significantly more manageable, easier to navigate, and more responsive.

Once a stable enlisted aviation production process is in place with measurements and the goal clearly defined (Appendix H and I), then efforts can be made to refine the system with Lean and Six Sigma. "Lean focuses on elimination of waste and what is value added and not value added, increased cycle times, and eliminating the cost of complexity."[59] Six Sigma focuses on "defect reduction and process predictability driven from hard data under a powerful framework of problem solving."[60] The use of Lean and Six Sigma on top of a TOC-established design would optimize the performance of the entire system.

Lean focuses on speed and efficiency with a relentless pursuit to reduce waste. Waste can be defined as anything other than the minimum amount of wait time, facilities, school seats, class convenes, trainers, and instructors which are absolutely essential to add value to the product.[61] Waste can be categorized in three ways: value added, non-value added, and required. Value added waste would be something that the operating forces would be willing to pay since they would receive the benefit, something that would change the form, fit, or function of the student.[62] Required waste does not change the form, fit or function of the student, but may be required by law, policy, or other regulation. "Non-value added waste would be everything not covered in the value added or required waste."[63] Some examples might be student pools that are

awaiting training prior to their class convening date or required Marine Corps or annual training are wasteful practices, but required to ensure no seat is unfilled and a Marine is deployable when he arrives to his first command. Almost every process is not lean and contains substantial waste, Lean identifies the forms of waste as "underutilization, defect, overproduction, transportation, waiting, excess inventory, excess motion, and non-value added processing."[64] Visual controls are another tenant of Lean and require that all indicators of production system performance be visual and transparent so the status of the system can be understood at a glance.[65] As in TOC, Lean is focused entirely on the customer and the customer determines all value, therefore a pull system must be in place where the demand is generated from the operating force to push through another student with the MOS required.[66]

Once the process has been leaned out and unnecessary waste removed, Six Sigma can be used to reduce variation in the process and improve quality and first time student yield. Six Sigma is a measure of process capability, the number of defects per million opportunities and evaluates output around the process mean to within 6 standard deviations (sigmas).[67] Defects can be defined as anything that does not meet the needs of the operational commander with the goal of six sigma being to reach 3.4 defects per 1 million opportunities.[68] The objective in driving Six Sigma performance is to reduce or narrow variation to such a degree that six standard deviation defines the customers' specifications.[69] Six Sigma increases process capability by defining what is important to the customer, measuring how the process is performing, analyzing what are the most important defects and variations, improving and removing the causes of variation, and controlling how to maintain improvements.[70] The use of Lean and Six Sigma on top of a TOC-established design would optimize the performance of the entire system.

Conclusion

The Commandant of the Marine Corps convened a force structure review group (FSRG) from 20 September to 17 December 2010 "to conduct a capabilities based assessment to review the active, reserve, and civilian manpower requirements of the Marine Corps."[71] Although the results have not been released at this time the Marine Corps has been planning a force reduction of some form for a while. A recent Marine Corps Times article "Cuts to the Corps" identified a drawdown of 20,000 Marines by 2015 by according to Secretary of Defense Secretary Gates.[72] The focus of the cuts in personnel and programs were to "cut the budget by $100 billion to re-invest in other programs that are determined as critical."[73] Former CMC, General Conway, who initiated the FSRG for the Marine Corps, "recommended reviewing the size and composition of several major commands in northern Virginia to include MCCDC, and TECOM."[74] Budget savings can best be generated through process efficiency that can eventually lead to force reduction in the right places. Budget savings and force reduction can be achieved through process improvement; this is why the Marine Corps needs an enlisted aviation production process.

A possible solution has been identified and is available, but the most critical element is that the process must be important to leadership. The right organizations are involved and there are a handful of people that understand the entire process. The Marine Corps must track the flow of students through the enlisted aviation production process and ensure that the Marine Corps is getting the proper product delivered. If this process is not taken seriously and improved to a state that it can be monitored and briefed to the General Officer level, then force structure can be gained by removing these billet line numbers from Training Command and Training and Education Command.

Appendix A

Definitions

1. "A" School Training. That training which provides basic technical knowledge and skills required to prepare for job entry-level performance and additional specialized skill training.

2. Center for Naval Aviation Technical Training (CNATT). CNATTUNITs are located on Naval Air Stations. They are composites of what were formerly NAMTRAGRUDETS, Fleet Readiness Aviation Maintenance Personal (FRAMP) and the Aviation Weapons Training Unit (AWTU) training program. These three separate entities were merged into Units or Dets under the command of the CO CNATT.

3. Center for Naval Aviation Technical Training Marine Unit (CNATT MARUNIT). Located on Marine Corps Air Stations, these MARUNITS were established by consolidating the former Fleet Replacement Enlisted Skills Training (FREST) that were co-located at MCAS' New River, Cherry Point, and Camp Pendleton.

4. Enlisted Aviation Maintenance Training Management Unit (EAMTMU). Designated agency established to provide centralized planning, scheduling, monitoring, and accounting of entry level, post entry level and lateral move enlisted aviation trainees through MOS qualification training upon completion of "A" and "C" school.

5. First Term Alignment Program (FTAP). This program controls reenlistments and maintains Career Force inventory at required levels. FTAP is a fiscal year plan that identifies the number of first term reenlistment requirements for each MOS.

6. Human Performance Requirement Review (HPRR). A review program convened by CNO where training tracks of given weapons systems/work centers are reviewed by representatives for the Fleet, EAMTMU, CNATT MARUNIT and Naval Air Systems Command (NAVAIRSYSCOM). Training deficiencies, if identified, are rectified by either additions and/or deletions to existing training tracks establishing new or revised training programs. The HPRR is the primary vehicle used in determining the training and training sequence aviation enlisted Marines will pursue to qualify for an MOS. Formerly, HPRRs were known as Maintenance Training Requirement Reviews (MTRRs).

7. Individual Training Standards System, Maintenance Training Management and Evaluation Program (ITSS/MATMEP). Used as a measure of job performance to determine if an individual can or cannot satisfactorily perform. The standards constitute a basis for individual training conducted in units and institutions. Also, training standards are designed to be used by the Commander to determine proficiency, evaluate individual training and maintain quality control of the training provided.

8. Maintenance Training Management and Evaluation Program (MATMEP). The standardized format for individual training standards (ITS) and developing training programs for the

MOS's covered in enclosure (2). These standards serve as an evaluation tool designed to ascertain the depth of the trainee's knowledge/experience and job accomplishments/capabilities.

9. Maintenance Training Unit (MTU). A unit that instructs maintenance personnel on the systems of a specific aircraft (i.e., F/A-18 or EA-6B), test benches, armament systems, or support equipment. The CNATTUDET's are located aboard Marine Corps and Navy installations and may be comprised of multiple MTU's. Equipment normally includes training panels, mock-up devices, and composite trainers, and computer-based training devices that simulate aircraft systems in operation. Will assist OPNAV in the preparation, administrative support, and hosting of MTRR's.

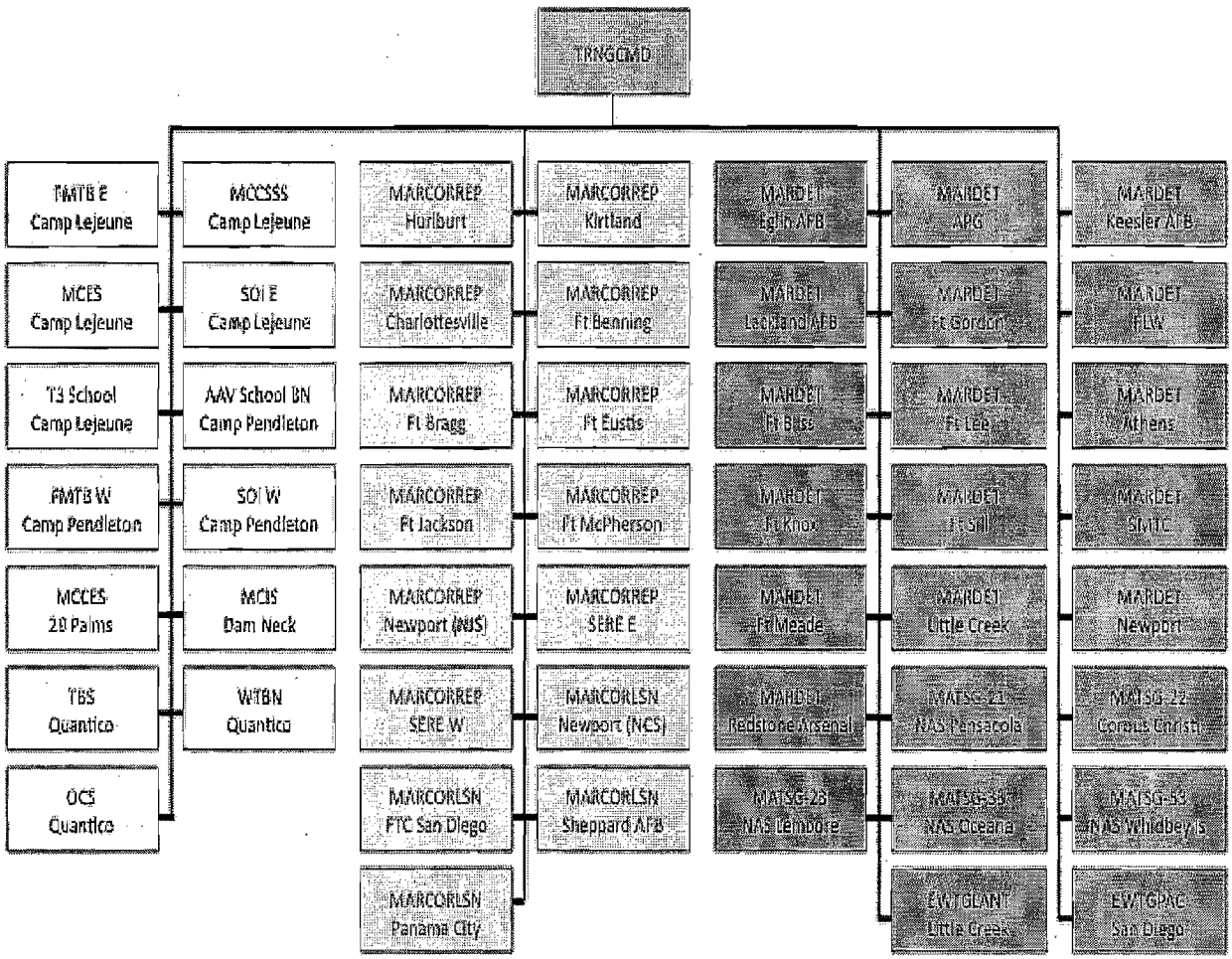
10. Program Enlisted For (PEF). A list of skills that are available to the enlistee based upon individual qualifications and needs of the Marine Corps.

11. Subject Term Alignment Program (STAP). This program is aimed at Career Marines (a Marine who has re-enlisted at least once) and establishes re-enlistment floors by Major Command and PMOS. These floors are based upon Career Force requirements, historical retention rates, and end of active service (EAS) populations by command.

12. Training Input Plan (TIP). The TIP is a constrained "snapshot" of the Marine Corps Training requirements and anticipated training seats. The TIP is used by schools to plan class schedules, instructor utilization, and equipment usage.

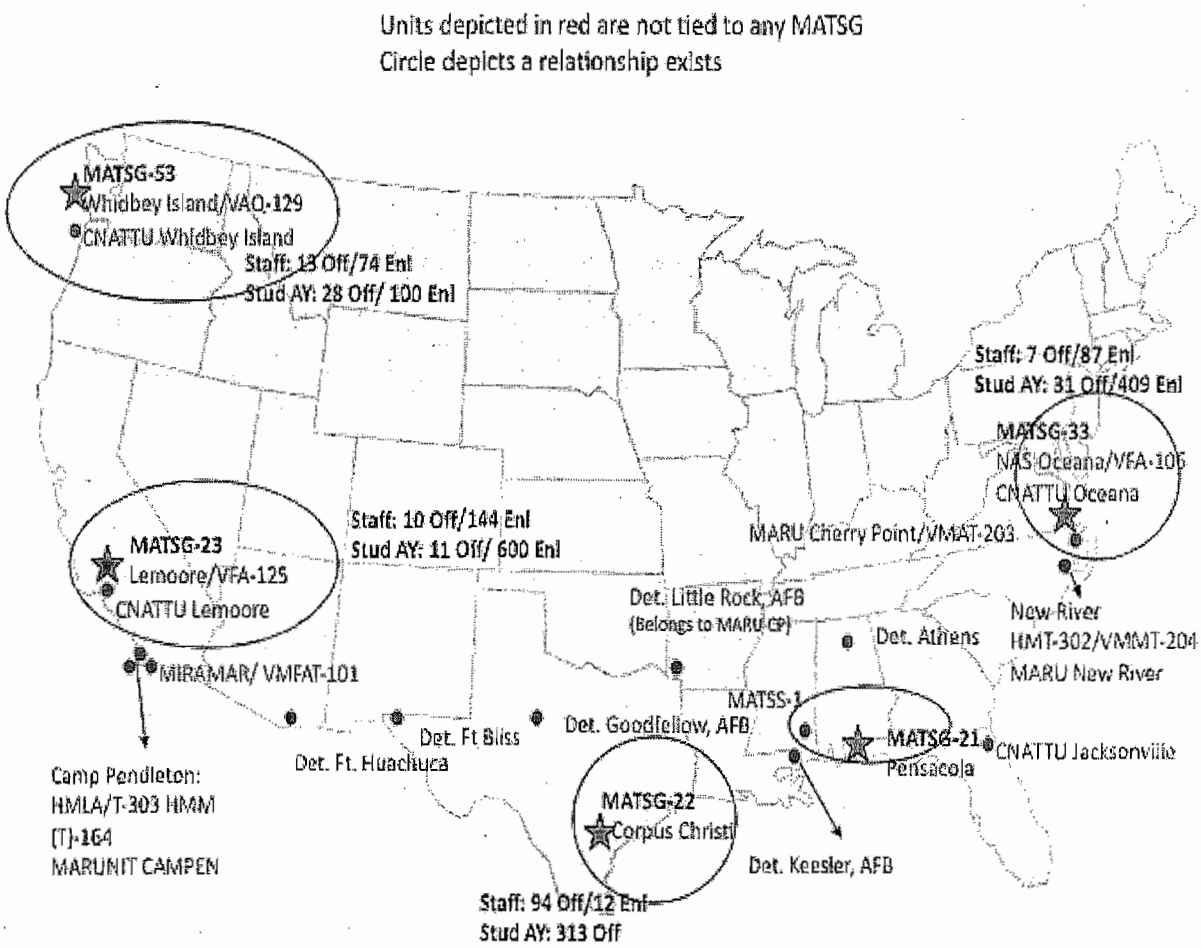
Appendix B

Training Command



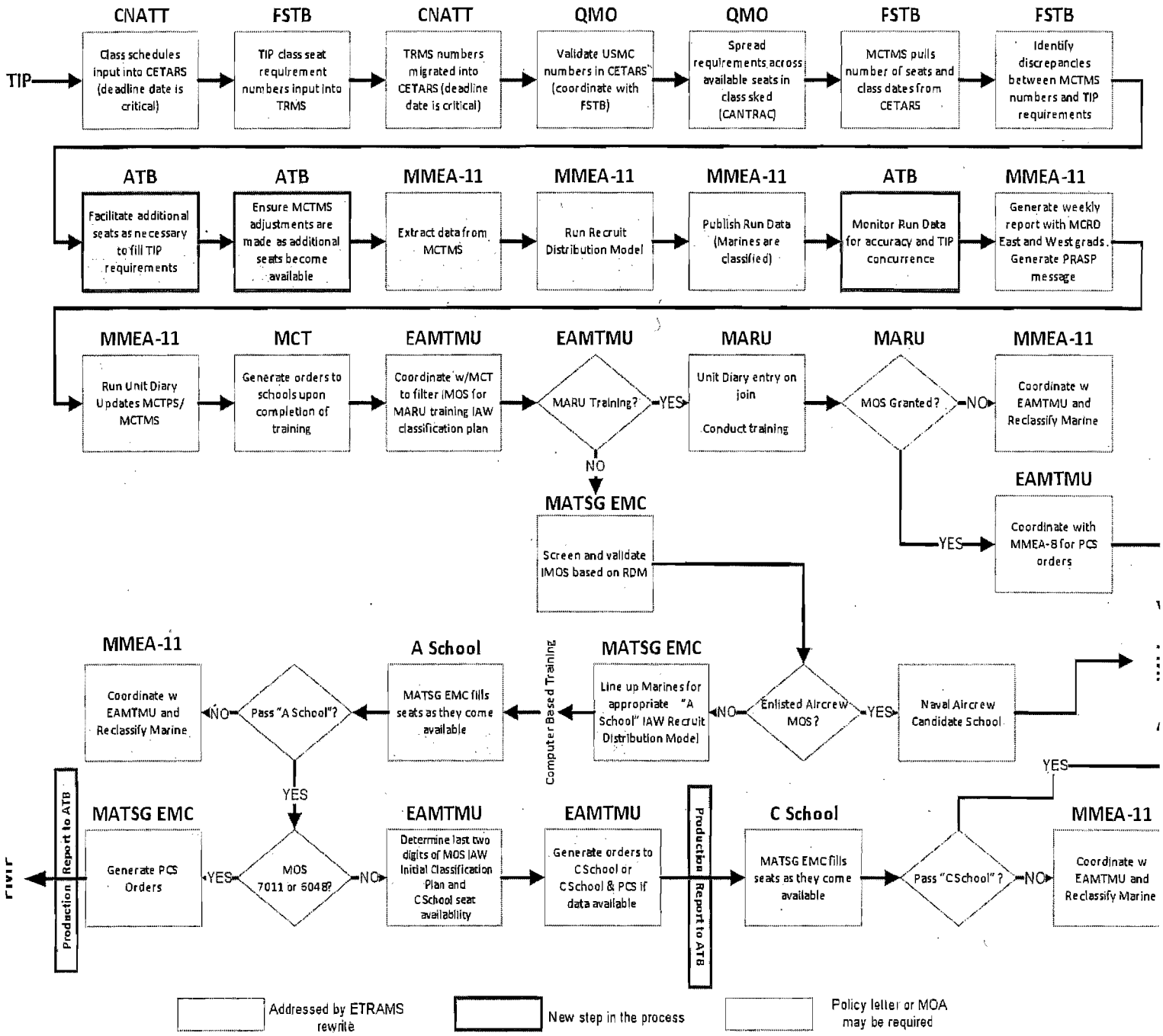
Appendix C

Current MATSG Organization



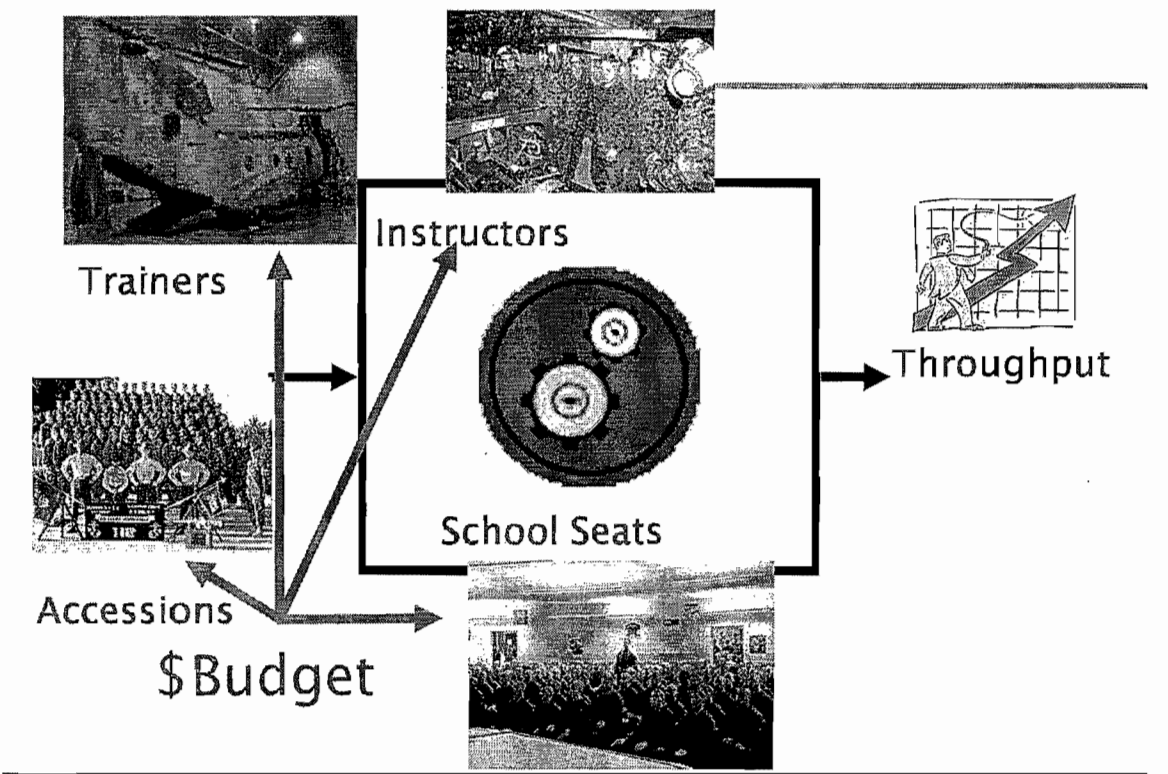
Appendix D

Current Process



Appendix E

The Mission Driven Machine



Appendix F

Five Focusing Steps

Theory of Constraints

The 5 Focusing Steps of TOC

1. Identify the system's constraint(s).
2. Decide how to exploit the system's constraint(s).
3. Subordinate/Synchronize everything else to the above decision.
4. Elevate the system's constraint(s).
5. If in the above steps a constraint has been broken, go back to Step 1.

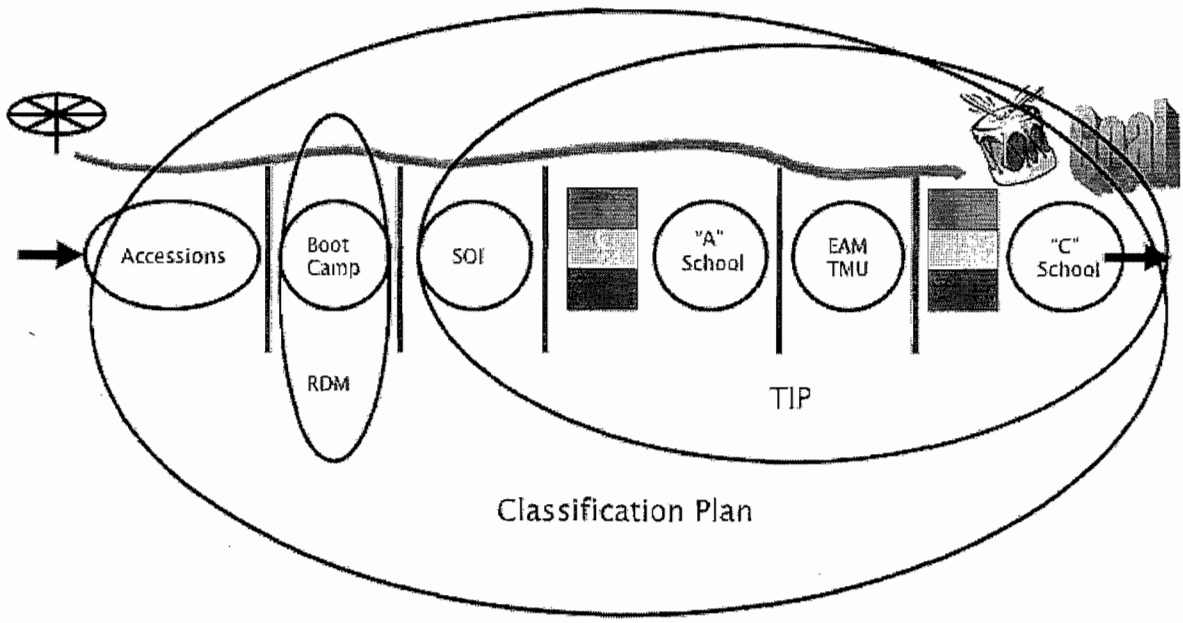
WARNING

Do not allow inertia to become the system's constraint!

A Process Of OnGoing Improvement

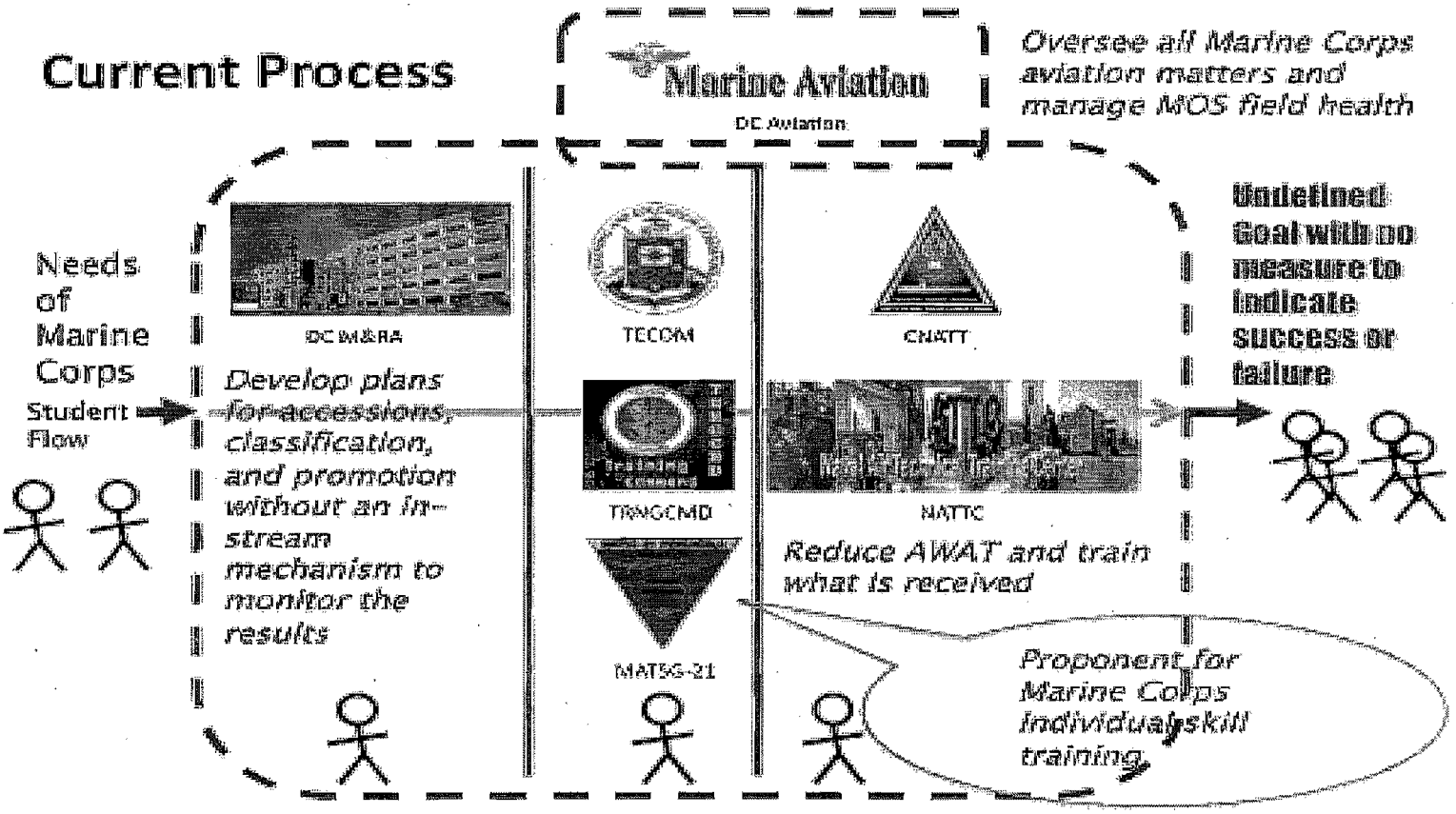
Appendix G

Student Pool Buffers Placed in the System



Appendix H

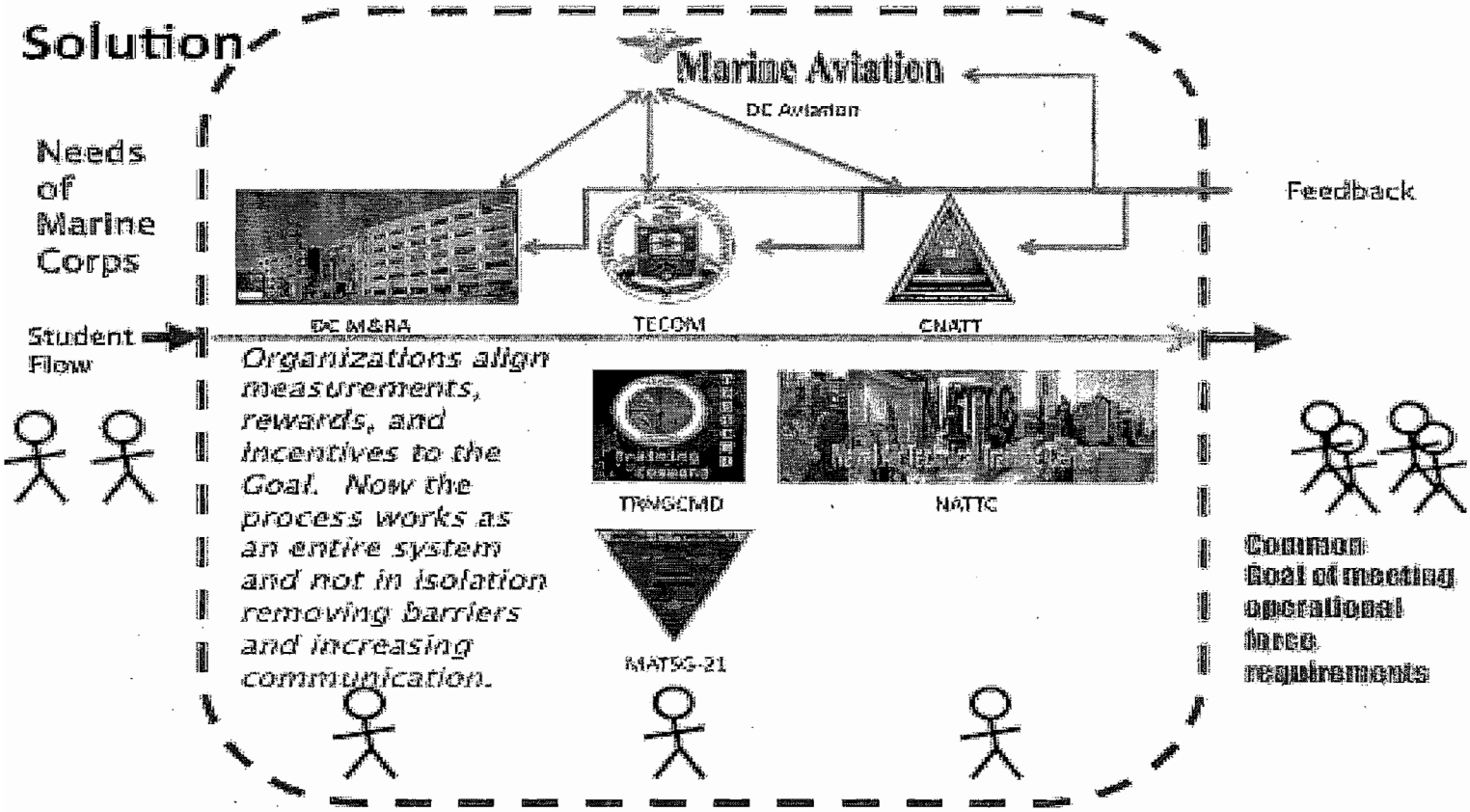
Current System



Each organization operates in isolation from the other. Each has their own specific way to measure, reward and incentivize success. There is no common goal among them.

Appendix I

Solution



By aligning local performance with global performance the conflict is broken between the two competing interests in the process

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